AMERICAN

EDUCATIONAL MONTHLY.

MARCH, 1873.

EMINENT TEACHERS DECEASED IN 1872.

OUR record commences on the 2d of January, 1872, with the name of ARTHUR SAVAGE TRAIN, D.D., an able and successful teacher, though his true vocation was that of the pulpit. Dr. Train was born in Framingham, Mass., September 1, 1812, received his early education under his father's tuition, (the father was a graduate of Harvard and a profound scholar,) and his collegiate instruction at Brown University, whence he graduated in 1833. From 1834 to 1836 he was tutor in his *Alma Mater*, and then was ordained and settled as pastor of the First Baptist Church in Haverhill, Mass., where he remained for more than twenty-three years, winning a high reputation for scholarship, eloquence and pastoral ability. In Nov., 1859, he was elected "Professor of Sacred Rhetoric and Pastoral Duties" in Newton Theological Seminary, Mass. He fulfilled the duties of his professorship with rare ability and success for seven years, but at the end of that time returned to the pastorate with evident satisfaction.

On the 3d of January, at Adrian, Michigan, died NATHAN BRITTAN, a native of Spencer, Mass., born Sept. 2, 1808, educated at Hawley Academy, Mass., and at Brown University, graduating from the latter in 1837. Immediately

after his graduation he entered upon the profession of teaching, being for some years associate principal of the Collegiate Institute at Rochester, with the distinguished Prof. Chester Dewey. From thence he removed to Lyons, N. Y., and some years later to Adrian, Mich., where he made his home for the remainder of his life. He continued teaching till 1852, having a high reputation both for general ability and for his special skill as a chemist and physicist. As a result of a long continued course of experiments on electricity, he devised in 1852 a form of lightning rod now known as the "Continuous Copper Strip," and for twenty years the greater part of his time was given to the explanation, introduction and manufacture of his invention.

HENRY DAGGETT BULKLEY, M.D., who died in New York city, Jan. 4th, at the age of 69 years, was rather a physician and author than a teacher, though he gave several courses of lectures in the College of Physicians and Surgeons on his specialty of Cutaneous diseases, and was a very admirable clinical lecturer at the New York Hospital and the Dispensaries. He was born in New Haven, graduated from Yale College in 1821, and received his M.D. in the Medical School of that College in 1830, subsequently studying his profession in Europe. His life after 1832 was spent in N. Y. city.

Rev. PERKINS KIRKLAND CLARK, who died the same day at Charlemont, Mass., at the age of 61 years, was not, except in the earlier portion of his career, a professional teacher. Graduating from Yale College in 1838, he had already had some experience as a teacher, and for two years following his graduation he taught in Savannah. In 1842, while connected with the Theological Seminary at New Haven, he was appointed a tutor in Yale College, and remained in that position till 1845. He then taught for a year in the Normal School at Westfield, Mass., and in Aug., 1846, was ordained as a Congregationalist minister. He did not subsequently engage in teaching, but took a deep interest in the promotion of education.

It would hardly be fair to count Major-General H. W. HALLECK (died Jan. 9) in our list of eminent teachers de-

ceased, on the strength of his single year's professorship at West Point (1839–40), and ISAAC RICH who died in Boston Jan. 13, and WILLIAM KELLY, of Rhinebeck, N. Y., who died at Torquay, Eng., Jan. 14, were noble benefactors of education, (Mr. Rich to the extent of more than a million of dollars) but not themselves teachers. We pass them, to Rev. ALEXIS JOSEPH ELDER, a Roman Catholic priest and professor, died at Baltimore, Jan. 19, who was for fifty years connected, in various capacities, with St. Mary's College and St. Mary's Seminary of the order of St. Sulpice, in Baltimore.

On the 5th of February, Rev. GEORGE W. THOMSON, long a teacher in Central and Western New York, died at Buffalo, N. Y., in the sixty-first year of his age. Mr. Thomson was born near Clinton, N. Y., graduated from Hamilton College in 1833 and from Auburn Theol. Seminary in 1837, was ordained in 1838, but after a brief pastorate was compelled by ill health to turn his attention to teaching. For more than ten years he was a popular and successful teacher, devoting himself with unwearying assiduity to his work. Then again he was compelled to change his calling in consequence of ill health, and engage in a business which would take him into the open air.

We can hardly suppose that the venerable ARCHBISHOP SPALDING, of Baltimore, who died Feb. 7, at the age of 62, ever purposed to follow teaching as a profession, but his reputation for profound and elegant scholarship was so high that on the decease of the President of St. Joseph's College, Bardstown, Ky., in 1835, he was called to take his place, although then but twenty-five years of age, and he performed its duties with signal ability for eight years.

On the 14th of February, died Prof. CHARLES ALFRED LEE, M.D., at Peekskill, N. Y., aged 71 years. Prof. Lee was a native of Salisbury, Conn., born March 3, 1801, graduated from Williams College in 1822, and from the Berkshire Medical School in 1825. In 1826 he came to N. Y. City, and in addition to his private practice, which at one time was large, he has edited and written many valuable medical and scientific works, founded the Northern Dispensary in

N. Y. City, and in the course of forty years was professor (usually of Materia Medica and therapeutics) in the following Medical Schools and Colleges: Medical Department University of New York; Do. of Bowdoin College, Brunswick, Me.; Berkshire Medical School, Pittsfield, Mass.; and the Medical Colleges at Geneva, N. Y., Woodstock, Vt., Columbus, Ohio, and Buffalo, N. Y. He was Emeritus Professor of the last at his death. Perhaps no medical professor in the country has had a larger number of young men under his instruction than Professor Lee.

DANIEL TREADWELL, A.A.S., one of the ablest scientists and technologists in the United States, and for eleven years Rumford Professor of technological Chemistry in Harvard College, died in Cambridge, Feb. 27, aged 81 years. He was born in Ipswich, Mass., in 1791, early manifested a passion for mechanics and practical science, and before his 30th year had invented a machine for making wood-screws and a power printing press. In 1822, he and Dr. John Ware established and conducted the *Boston Journal of Philosophy and the Arts*. His inventions continued to be numerous and of great value, and in 1834, as the most eminent disciple of Count Rumford, he was elected Rumford Professor of Applied Sciences and the Arts in Harvard College. He held this professorship for eleven years, and then resigned to enter upon the manufacture of cannon, by an improved process of his own invention, for the government.

On the 1st of March, died THOMAS RUSSELL CROSBY, M.D., at Hanover, N. H., aged 55 years. He was a son of Prof. Dixi Crosby, of Dartmouth College, Medical Department, and graduated both from that College and the Medical School in 1841. Not long after taking his degree he was called to the Medical Department of the Norwich University, Vt., first as Adjunct and soon as full professor of Anatomy, Physiology and Natural History. He held this position with great ability for nearly twenty years, and then returned to his practice at Hanover.

Rev. JOHN METCALF GARFIELD, who died in New Haven, Conn., March 10, at the age of 82 years, had spent thirty-two years of his life in teaching; and, indeed, had been in

some sense the instructor of a humble and ignorant class for twenty-three more. He was born in Grafton, Mass., July 21, 1790, graduated from Yale College in 1816, commenced the study of law, but soon turned his attention to teaching, and in 1817 became a teacher in Lansingburgh, N. Y., in 1818 principal of the Troy Grammar School, and in 1819 founded a Female Seminary in New Haven, Ct., of which he was the successful principal till 1831, when he was appointed Principal of the Albany Female Seminary, in which he remained till 1849, when he resigned and returned to New Haven. In 1823 he had been admitted to the priesthood in the Episcopal Church, and after his return to New Haven he had charge, as pastor and teacher, of a church of colored people in that city.

On the 26th of March, Mother MARY ROSE, (Gauthreaux) Superior Vicar of the Western province of the Order of the Sacred Heart of Jesus, a conventual order of philanthropic teaching and Missionary service, died in Chicago, Ill., aged 47 years.

SAMUEL HENRY DICKSON, M.D., LL.D., who died in Philadelphia, March 31st, in the 74th year of his age, had been for nearly fifty years a medical professor. He was born in Charleston, S. C., Sept. 20, 1798, graduated from Yale College in 1814, studied Medicine in Charleston, and practised there during the terrible epidemic of yellow fever in 1817, subsequently prosecuted his studies in Philadelphia, and took his medical degree there in 1819. In 1823, he commenced lecturing before the physicians and medical students of Charleston on physiology and pathology; in 1824, was called to the Chair of Institutes and Practice of Medicine in the New Medical College there, which he had helped to found. In 1832 he resigned, but on the reorganization of the College in 1833 he was reëlected and continued there till 1847, when he was called to the Chair of Practice of Medicine in the University of the City of New York, but in 1850 his health obliged his return to his former post. There he remained till 1858, when he was called to the Chair of Practice of Medicine in the Jefferson Medical College, Philadelphia, where he continued to lecture until his

death. Dr. Dickson was the author of several medical and other works, which indicate talent of a high order.

Rev. LEMUEL FOSTER, who died at Washington Heights, Ill., on the 1st of April, in the 73d year of his age, had been very active for many years in founding Academies, and at times in teaching in them, in Central Illinois, for nearly forty years. He was a graduate of Yale in 1828, and of the Yale Theological Seminary in 1831.

Rev. THOMAS COGSWELL UPHAM, D.D., LL.D., celebrated alike as a professor, philosopher and author, who died in N. Y. City, April 2d, at the age of 73 years, had passed very nearly fifty years of his life as a teacher. He was born in Deerfield, N. H., Jan. 30, 1799, graduated with high honors from Dartmouth in 1818, and from Andover Theol. Seminary in 1821. He was immediately employed at Andover as teacher of Hebrew, and in July, 1823, ordained as colleague pastor at Rochester, N. H., whence he was called, in Sept. 1824, to be professor of Mental and Moral Philosophy and Lecturer on Biblical Criticism, in Bowdoin College, Brunswick, Me. He filled this Chair with great acceptance till 1867 (forty-three years) when he resigned, and was appointed Professor *Emeritus*, but continued to give occasional lectures till a short time before his death.

April 5th was a fatal day for teachers; on that day died ZINA PITCHER, M.D., an eminent physician of Detroit, Mich., who had been for many years a professor in the Medical Department of the University of Michigan, at Ann Arbor, and who possessed rare abilities as an instructor; SAMUEL JACKSON, M.D., LL.D., who died in Philadelphia, aged 85 years, Emeritus Professor of the Institutes of Medicine in the University of Pennsylvania, and from 1835 to 1863, active professor of the same department, as well as an author of great ability; and Hon. SAMUEL GALLOWAY, of Columbus, Ohio, who died at the age of 61 years, who, though honored and trusted as a member of Congress and Secretary of State for Ohio, yet derived his highest honor from his labor as a teacher, and professor in Miami University and Hanover College, Indiana, for five years; from his position as President of the Ohio Teachers' Association, and from

his earnest efforts in the promotion of education during his term of service as Secretary of State.

JOHN T. WALSHE, who died at Mobile, Ala., on the 7th of April, aged 58 years, was a native of Ireland, a graduate of Trinity College, Dublin, and a man of elegant scholarship, who came to this country in 1836. Twenty-three years of his life were spent in journalistic and literary pursuits, but for twelve years he was professor of Ancient Languages and Literature in Spring Hill College, near Mobile.

Rev. CHANCELLOR HARTSHORN, who died April 9th, at Ann Arbor, Michigan, aged 71 years, had been, soon after graduation, some three years a professor in the Hamilton Literary and Theo. Institution, now Madison University.

Rev. A. M. POINDEXTER, D.D., an eminent Baptist clergyman of Virginia, who died April 14, near Gordonsville, Orange Co., Va., was not only an elegant and popular preacher, and active in all good enterprises, but was one of the founders, and for some years professor in Richmond College, Va., to the prosperity of which he devoted his highest efforts.

ANN PRESTON, M.D., who died in Philadelphia, April 18, at the age of 58 years, was not only remarkable for her skill as a physician and her ability as a writer, but for having been for eighteen years Professor of Physiology and Hygiene, and Dean of the Faculty of the Woman's Medical College of Philadelphia. Her lectures and teachings were very able and would not suffer by a comparison with those of any professor of the same topics in Philadelphia.

Rev. CHARLES RUSSELL CLARKE, who died the same day at San Diego, California, at the age of 40 years, had employed fourteen years of his brief life in teaching. He graduated from Princeton College in 1852, and taught in Newtown, L. I., Geneseo, N. Y., as tutor for three years in Princeton, and as private instructor in Com. Stockton's family, and from 1861 to 1869, in San Franciso, as Principal of a Female Seminary there. He was an enthusiastic and successful teacher.

Though an earnest and zealous friend of popular educa-

tion, Rev. GEORGE B. IDE, D.D., who died at Springfield, Mass., April 16, at the age of 66, could hardly be recognized as a professional teacher. He had, indeed, taught for one or two years after graduating, and successfully, and few men have done more to promote thorough education.

April 27, died NATHANIEL F. MOORE, LL.D., at his home on the Highlands, in the 90th year of his age. He was born at Newtown, L. I., Dec. 25, 1782, graduated from Columbia College in 1802, was admitted to the bar in 1805, appointed Adjunct professor of Latin and Greek Languages and Literature in Columbia College in 1817, was professor of the same studies from 1820 to 1835, librarian from 1837 to 1842, and President of the College from 1842 to 1849. He was the author of several valuable scientific works, and of an historical sketch of Columbia College. He was a very thorough and profound scholar.

JACOB HARDENBERGH, who died at Albany, April 29, aged 49 years, a State Senator, would have been a capital teacher had he not suffered himself to be drawn away from that work by the attractions of political life. His three or four years of teaching at the Academy in Fonda, Montgomery Co., N. Y., in 1844–48, while he was preparing to enter the legal profession, left an impression of capacity, ability and thoroughness, which have remained as one of the traditions of the town for a quarter of a century.

Of EDWARD BARRY DALTON, M.D., who died at Santa Barbara, Cal., on the 13th of May, at the age of 39, the little we know only inspires a desire to know more. He was educated at Harvard College, whence he graduated in 1855, and after devoting some time to Scientific studies, turned his attention to the Medical profession and took his degree as M.D. from the College of Physicians and Surgeons, N. Y., in 1858. Like his illustrious brother, he was an earnest student of science; he served as Surgeon and Medical director during the war from April 30, 1861, to May 13, 1865, and at its close commenced a career as Medical Lecturer and instructor, and prepared two or three very excellent text-books; but his health, which had been impaired by his army service, continued to fail, and though he resorted too

ıate to the balmy air of Scuthern California, he fell a victim to consumption.

On the 15th of May, died THOMAS HASTINGS, Mus. Doc., at the venerable age of 88 years. For nearly half a century he had been an active and efficient teacher of Sacred Music, and the author of more books of instruction in that science, and more collections of religious music, than any other musical writer, with possibly a single exception in the United States.

Rev. ALBERT HOPKINS, LL.D., A.A.S., F.R.S., who died at Williamstown, Mass., May 24, aged 65 years, was one of those teachers whose loss falls heaviest on those who remain. Modest, gentle, unselfish, and never apparently conscious of his own rare abilities and attainments, he was yet a model teacher. Thoroughly versed in the whole realm of mathematical and astronomical science, he possessed also the skill to rouse the enthusiasm of his pupils and lead them, without faltering, along those steep and slippery heights, which he had already trod. Prof. Hopkins was born in Stockbridge, Mass., July 14, 1807. He was fitted for College at the Stockbridge Academy, and graduated from Williams College, in 1826, with high honors. In 1827 he was recalled as tutor, and in 1829 appointed professor of Mathematics and Natural Philosophy; in 1838, this was exchanged for the Chair of Natural Philosophy and Astronomy, and a few years since, on the foundation of his classmate, David Dudley Field, he became Memorial Professor of Astronomy. His whole term of service as a teacher in this College was forty-five years. In 1869 he was elected a Fellow of the Royal Society, London, an honor conferred in our time only upon one other American. With his other duties, Prof. Hopkins was also acting Pastor of the College Church, and his duties growing out of this relation were admirably performed, and in them his loss will be deeply felt.

THE gaining of reputation is but the revealing of our virtue and worth to the best advantage.

A SEASONABLE TALK WITH TEACHERS.

SCHOOL ROUTINE—STUDIES TOO ADVANCED FOR THE PUPIL—WORDS IN PLACE OF THINGS—THE NATURAL METHOD—VALUE OF NATURAL HISTORY—OBJECT LESSONS IN BOTANY.

BEFORE many weeks the district schools will have opened again for the summer term. The children will gather once more to resume the invariable round of reading, writing, geography and arithmetic. It is the same old story, term after term and year after year; and it is no wonder that even bright boys and girls sometimes find it a dull routine. Especially is it so when the school-ma'am simply "keeps" school and "hears lessons" without *teaching* at all. Not that the keeping and the lesson-hearing are not a part of the teacher's duty; but we mean to imply that they do not constitute the whole of it,—that both these things combined do not make the *teacher*.

When we consider how much time is devoted to the two staple studies, arithmetic and geography, and yet how poor a training and outfit in them is actually furnished in most schools, we are disposed to inquire if a better use cannot be made of a portion, at least, of the time usually assigned to them. It is just possible that geography is introduced too soon—that is, geography as generally first presented, in a text-book; and also that the processes of logical arithmetic—ciphering and the rest—find place at too early a point in the educational course. Certainly the average outcome seems slight, when we consider at what an outlay of time and labor it has been produced. It is safe to say that both these branches could be deferred for two years, and grammar for a still longer period, and yet the pupils be furnished, at the age of fifteen, with a fuller and more scientific and more usable knowledge of all three than they now possess. The poverty of results accruing from our schools, as now managed, is due partly to false and unproductive methods of instruction, but partly also to the fact that the fit time for beginning these studies is unwisely anticipated. Weariness and disgust are the too frequent results of the effort to force the infant mind. Unable to grasp the subjects presented, getting but empty words in place of ideas, failing to

get through the husk to the kernel, it conceives an indifference or an aversion to the uncomprehended science that seldom, often never, wears wholly away.

But what does the ordinary graduate of the public school —say at fifteen years—know of the world in which he finds himself? How unskilled he is in the "three R's," everybody can testify. He finds himself surrounded with countless objects of sight and touch, with most of which he has but the slenderest acquaintance. The curiosity that was so quick and restless at the age of five, is now languid, listless, all but dead, repressed by the artificial drill of the schoolroom. Before the school seized upon him he was ever on the alert; all eye, all ear; experimenting with touch and taste: by actual trial solving his own questions so far as he was able; and puzzling his elders by his incessant What and How.

He was working out his own education hour by hour, getting a wider knowledge of *things*, and by contact with things constantly developing and strengthening his powers. What knowledge he gained was first-hand; it was his own. It was *real* knowledge; that is, knowledge of realities, and no mere *say-so* of book or teacher. He understood as far as he went, and went just as fast as he understood. His parents may have thought he was wasting his time; but he was learning faster and more thoroughly—we are sure of it—than after he came under the hand of the professor of A B C. Under the guidance of his five senses, he learned facts; or if he did not, he was in the way of correcting all his errors. At school he got signs and symbols, whose use and meaning were but dimly perceived. He ceased gradually to learn from things, and came more and more to trust to books. The sun rose in the east, for "the book said so." In an arithmetical computation he multiplied or divided, because "the rule said so." If he wished to know how many bones there were in his hand, or how many legs a fly had, he looked in a book to see. He had become the slave of the book. He had ceased, in a great measure, to use his own eyes and his own judgment, and had come to mistake words for things, and sentences for truths. In the school-room his self-reliance, his mental independence, dwindled away; and

his knowledge—and so his power—was conditioned on what he could *remember* of his lessons and rules.

This representation may seem unfair and one-sided. We could wish there were no grounds for it. We know there is a general movement in the educational world toward better methods,—methods in conformity with the nature both of the child and of things—methods that are designed to stimulate and guide the native curiosity of the live, irrepressible, often puzzling and unanswerable, little interrogation point. But we know, too, that this change is working but slowly in the schools of many sections of the country,—that the old ruts are deep and hard to leave; that the old traditions have a firm and tenacious grip on all, or nearly all, our primary school teachers. They may not be satisfied with the ways they follow, but they know, and so can employ, no other. Should they leave the beaten path, they would be utterly at sea. Besides, new ways would require thought and study. Better methods might necessitate some work on their part. This consideration, however, will stumble only those who ought never to have thought of school work—not the true *teacher*, her who is "called" to this high office. To such one we have a suggestion to make.

By the time your school opens, spring will have come in good earnest. The earth will be covered with plants and flowers; the air be full of birds and insects. Why not take up some department of Natural History? You may not be versed in any branch of it, and so hesitate to make the attempt. Never mind: can you not learn? Do you not know at least as much about it as the ten-year-olds, and can you not learn as fast as they? Suppose you choose Botany,—on the whole, perhaps, the best branch for the experiment you would make. No matter if you cannot tell a stamen from an axil, an anemone from a pitcher-plant. We may learn by teaching, you know. Get a copy of Miss Youmans' *First-Book of Botany* [D. Appleton & Co., N. Y.], a *system* of object lessons, the most suggestive and helpful book for beginners [say pupils from six to ten years old] that we have yet seen. Read her very sensible preface and suggestions to teachers; examine the numerous illustrations and accompanying schedules; note how gradually and with what or-

derly sequence she develops the elements of the science, without confusion, or mixing of vegetable physiology; see how in the examination of leaf, stem, flower and root successively, she exercises and trains the powers of observation, so alert at this age, but which the old method neglects; and then ask yourself if you cannot work so simple, so practical a scheme. We make no question that your pupils would rejoice in it, that your own enthusiasm would be kindled by it, and that the plant lessons would be among the most useful, as they would be sure to be the most delightful of the whole term.

Our reasons for giving this advice we cannot state here, but happily there is little need, for you will find a capital discussion of the whole matter in an essay at the end of the book, which we wish every teacher might read, mark, and inwardly digest. This essay alone is worth the price of the book. By the time the summer schools of 1873 open, we hope the author will have the second book ready, so that you and your classes may go on under her direction. Meanwhile, without waiting for that, get Prof. Gray's little volume, *How Plants Grow and How Plants Behave*, and prepare yourself to answer the thousand questions which your children will ask you day by day. If, faithfully following this advice, you fail of success, we hereby engage to buy again of you, at the end of the summer term, your copies of Prof. Gray's and Miss Youmans' books, and pay full price therefor.

A LITTLE island in the Connecticut, at Woodville, is a piece of patchwork so far as geography is concerned. The Vermont and New Hampshire State line runs through it. Grafton, Caledonia and Orange counties corner there, and also the towns of Bath and Haverhill, in New Hampshire, and Ryegate and Newbury, in Vermont. One can sit down at a certain point on that island and be in two States, three counties, and four towns at the same time—that is, if he gets exactly on the "certain point."

THE Bible which John Bunyan used in Bedford jail has been brought to this country by Hon. Charles Sumner.

GEOGRAPHICAL NOTES.

UNITED STATES.—The Paris *Tour du Monde*, relying on certain Canadian journals, greatly exaggerates the emigration from Lower Canada to New England. Thus, it reckons the French Canadians in Massachusetts at over 50,000, whereas, according to the last census, there were in that State but 38,689 Canadians (whether French or English). In like manner, Fall River is credited with 7,500 instead of only 1,129; Lawrence with 1,500, instead of 1,306; Lowell with 3,700 instead of 2,620. Cowley, in his "History of Lowell" (Boston, 1868), describes a procession of over twenty-five hundred factory girls, "clothed in white" and looking "like liveried angels," which took place in 1834, and greatly impressed M. Michel Chevalier, who happened to witness it during his visit to this country. In 1861, Prince Jerome Napoleon found "their places filled by a motley crowd of Americans, English, Scotch, Irish, Dutch, and French Canadians, who were hardly likely to arouse that exquisite poetic sentiment which Chevalier felt for the factory girls of 1834." Vermont, from its position on the border, naturally stands next to Massachusetts, having 28,544 Canadians. New Hampshire has 11,901; Connecticut, 10,056; Maine, 9,410; Rhode Island, 8,933.

——Before leaving the subject of our composite population, let us note that a correspondent of the *Eco d' Italia*, of this city, states that "the Italian population in California and the adjacent States and Territories undoubtedly exceeds 20,000 or even 22,000 souls." They are chiefly peasantry from Liguria, Tuscany, and Sicily—the Genoese (Liguria).outnumbering all the rest. "The number of males is fifteen times that of the females . . . . . They are generally very industrious and enterprising, and particularly valued as farmers and fishermen—the latter being not few in number." Thousands labor in the mines, and frequently succumb there. Those who betake themselves to commerce for the most part do well.

——Tin forms part of the mineral wealth of California

being found in the lower half of the State. The San Jacinto tin estate is in San Bernardino County, about 50 miles east of Los Angeles, where, it is said, the Company have fifty tin-bearing ledges, some of them with the unusual breadth of ore of thirteen feet, bearing 25 per cent. of pure metal. This native product is already used by the type-founders of the State in the composition of their metal.

——The Yo Semite Valley is now declared to have a dangerous rival in the cañon of the Tuolumne River, just explored for the first time by Mr. John Muir. According to the San Francisco *Bulletin*,

"He reports that this cañon lies about eighteen miles in an almost due northerly direction from Yo Semite Valley, and the main Tuolumne runs through it. It curves in an unbroken line for over forty miles, and runs up to and ends in the very heart of the summits of the upper Sierra Nevada. The uneuphoniously named Hetch Hetchy Valley constitutes an expanded portion of the great Tuolumne cañon, which properly begins at the eastern end of Hetch Hetchy, and has, from thence to its head, a length of twenty miles of continuous, unbroken vertical walls of granite, similar to, but more clear cut, and with much greater depth than those of Yo Semite Valley. Yo Semite Valley has an average width of half a mile, and is in one place a mile wide, but the Tuolumne cañon has nowhere a width exceeding a quarter of a mile, and is in some places much narrower than that. The Tuolumne river, which runs through it, has twice the with of the Merced. The falls of the Merced-Yo Semite surpass those of the Tuolumne cañon in unbroken volumes of descending water; but, in endless variety of cascades and water-shoots, the Tuolumne cañon is far superior. The great walls of the cascade are seamed by water-worn fissures, down which rivers leap, churn, thunder, brawl, and sing with all possible varieties and expressions of sound."

——"Gorges which throw Yo Semite into the shade," however, appear to be numerous enough in the Far West. The Washington correspondent of the Cincinnati *Gazette* says that such are to be seen photographed in the collection brought back by the Hayden expedition, whose explorations, during the past summer, covered an area of 500 miles along the Rocky Mountain range, southwardly, from near the northern boundary of Idaho, by a width of 130 miles. The region explored in 1871 was east of this. A new geyser basin was discovered at the upper end of Lake Sho-

shone, containing about 130 geysers, of which twenty or thirty are of the largest size. The ornamentation about these springs was thought to be more interesting and elaborate than those in the Fire Hole basin.

"The divide between the Yellowstone Lake and Lake Lewis is fifty feet above the former and about two hundred feet above the latter. From a high mountain above this lake a view was obtained embracing a radius of not less than one hundred and fifty miles, within which four hundred and seventy mountain peaks, worthy of a name, could be distinctly observed. The area which could be swept by the eye from this point, could not be less than fifty thousand square miles, embracing a variety of grand and beautiful scenery, of mountain and valley, probably without a parallel on the continent. Ten large lakes, and many smaller ones, were embraced in the view, and the entire Yellowstone Park spread out under the eye. To the east the Wind River and Big Horn ranges of Mountains, with Fremont's 'Union' and Cloud peaks, bounded the view. On the north the Snowy range, with Emigrant peak, and the loftiest peaks of Montana were readily distinguished. To the west the Salmon River mountains of Idaho only shut out the view, while to the far south the mountains near Fort Hall and the Wahsatch range in Utah completed the mighty amphitheater. The view embraced a large portion of Wyoming, Idaho, Montana, and Utah Territories, an extent which will be difficult of belief to anyone who is a stranger to the singular purity of the atmosphere in high latitudes."

——The last sentence reminds us of what Prof. Young, of Dartmouth, has been doing in the pure atmosphere of the high latitudes. He was attached to the Coast Survey expedition stationed last June at Sherman, the summit of the Union Pacific Railway (Wyoming), between parallels 41° and 42° N., and meridians 105° and 106° W. To establish the exact position of this place (or, technically speaking, its "geographical and topographical constants"), as a reference point and base for all the numerous surveys going on in that part of the country, was the chief object of the expedition. Prof. Young carried with him the Dartmouth equatorial, which was placed in the observatory improvised at a height of 8,300 feet above the sea. Here is his account of some of the gains to science from observations made and to be made on this lofty perch:

"Whenever the sky was unclouded the air was usually of most exquisite transparency. At night multitudes of stars, invisible at

lower elevations, were easily seen; so that it was estimated that nearly all the stars of the seventh magnitude were fairly within reach of the naked eye. For instance, in the quadrilateral which forms the bowl of the 'Dipper,' I could see distinctly nine stars, with glimpses of one or two more, while at home I can only perceive the three brightest of them.

"The power of the telescope was correspondingly increased. Without being able to devote a great deal of time to the stellar observation, I ascertained that, with my $9\frac{4}{10}$ inches of aperture, nearly everything could be fairly seen which, at the sea-level, is within the reach of a 12-inch object-glass.

"But in the use of the spectroscope the advantage was even greater. At Hanover I had been able to make out a list of 103 bright lines in the spectrum of the chromosphere; at Sherman the number was extended to 273; and at moments of unusual solar disturbance there were glimpses of at least as many more."

——Lieut. Wheeler's expedition, of whose proposed operations we gave a summary in our December Notes, reached Washington at the beginning of the year, having been four months absent from Salt Lake City, most of the time in the western and southern portions of Utah. In November they reached Prescott, in Arizona, having crossed the track of Major Powell and his companions on the Colorado at the lower end of the Grand Cañon. A correspondent of the Boston *Advertiser* gives the following graphic sketch of the topography of Utah:

"Upper and central Utah are rich in glorious scenery, lofty, snowy mountains, fair valleys, dotted here and there with towns and hamlets, deep and gloomy cañons, and a climate hard to be surpassed. Descending, however, over the imperfectly defined rim of the Colorado Basin, you enter upon a new region, of different climate, different altitude above the sea, different vegetation, and above all differ ent geologic aspect. Through and across this vast basin we have been traveling almost ever since I wrote you last. Three thousand feet lower than the country above the rim, the vegetation might be expected to be of an almost entirely new zone; and so we found it, making forays rich with loot into the vineyards and orchards of the settlements, eating figs both fresh and half-dried from the same trees, and seeing the almond and other semi-tropical trees in successful growth. For the sage-brush and pines of the north, we rode daily through mile after mile of grease-wood and mesquite, finding abundant yuccas and cacti as we drew nearer to the Colorado. But however changed were the climate and vegetation, the altered character of the scenery was the most noticeable feature of the lower country.

For we had descended into the vast network of cañons belonging to the Colorado's tributaries. . . . . From the rim of the basin we had a comprehensive view of this much-convulsed and eroded country, and, descending into it, found ourselves winding again and again through stupendous cañons, here several rods only wide, and there stretching till they almost lost the name of cañons and became valleys. Nestling in these valleys, bathed in the balmy atmosphere of the region, and meeting us unexpectedly as we rode along the rolling country roads, were the cozy towns of this occidental 'Dixie,' as the southern end of the territory is called."

Of the grand cañon the same writer speaks in these admiring terms:

"No words of mine, drawn from so slight an acquaintance, can give you an adequate conception of the vast scale and imposing wonders of this river and this marvellous cañon: the perpendicular walls rising at one bound thirty-five hundred feet in the air; the castellated and columnar structure at the entrance of the cañon, where twin towers stand at enormous heights, as though forbidding passage with Titanic prohibition; the swift river, pent here and there within narrow walls, and roaring with hoarse rage over frequent rapids, gliding out in other places with placid current but with immense power into broad lake-like expanses, where swimming against it would appear the easiest matter in the world, if you had not tried it; and around and above all, the soft, slumbrous air of this wonderful climate, tender as a dream of love, filling the far-off windings of the cañons with purple glory, a royal color, and toning the harshness of near foothills of barren rock and glaring sand into a soft indistinctness akin to beauty."

AFRICA.—Sir Bartle Frere has reached Zanzibar. Advices received at that place to the 30th of November, 1872, state that Dr. Livingstone had written from Unyanyembe of the arrival of the expedition with supplies despatched by Stanley before the latter left for England. Thus equipped, the Doctor had started again for the interior on the 18th of August. That life at Unyanyembe is not so outlandish as the name of the place, the reader of Stanley's "How I Found Livingstone" discovers, perhaps with some surprise:

"At Tabora" (another name for Unyanyembe, which really consists of three neighboring settlements,) says he, pp. 264, 265, "they live quite luxuriously. The plain on which the settlement is situated is exceedingly fertile, though naked of trees; the rich pasturage it furnishes permits them to keep large herds of cattle and goats, from which they have an ample supply of milk, cream, butter and ghee. Rice is grown everywhere, sweet potatoes, yams, muhogo, holcus

sorghum, maize or Indian corn, sesame, millet, field peas or vetches, called choroko, are cheap, and always procurable. Around their tembes [houses] the Arabs cultivate a little wheat for their own purposes, and have planted orange, lemon, papaw, and mangoes, which thrive here fairly well. Onions and garlic, chilies, cucumbers, tomatoes, and binijalls, may be procured by the white visitor from the more important Arabs, who are most undoubted epicureans in their way. Their slaves convey to them from the coast, once a year at least, their stores of tea, coffee, sugar, spices, jellies, curries, wine, brandy, biscuits, sardines, salmon, and such fine cloths and articles as they require for their own personal use. Almost every Arab of eminence is able to show a wealth of Persian carpets, and most luxurious bedding, complete tea and coffee services, and magnificently carved dishes of tinned copper and brass lavers. Several of them sport gold watches and chains, mostly all a watch and chain of some kind. And, as in Persia, Afghanistan, and Turkey, the harems form an essential feature of every Arab's household."

ASIA.—In the northeastern part of Hindostan is the province of Assam, through which flows the Brahmaputra. Among the mountain ranges in its southern part dwell the Nagas, concerning whose country a recent English traveler, Mr. S. E. Peal, says that one finds there villages situated within sight of each other whose inhabitants cannot understand one another, owing to radical differences of speech. Each of these wretched tribes regards itself as the most powerful people in the world, and the humblest member of the lowest one of them smiles disdainfully at mention of the English. They believe themselves invincible because they have in night attacks depopulated all the country to the south of the Brahmaputra. Naturally enough, their religion seems to consist wholly in the fear of devils *(deotas)*. The several tribes differ unmistakably from each other in appearance and physique, as well as in their modes of tattooing, by which social rank is indicated among them.

Bibliography.—Appletons' Hand-book of American Tour. Southern Tour. New York: D. Appleton & Co. 1873. (Contains general and special maps.)——BOYLE, FREDERICK. To the Cape for Diamonds. London, 1872. (See notice in *Athenæum* of Dec. 21.)——DE CARNE, LOUIS. Travels in Indo-China and the Chinese Empire. London, 1872. (See review in the *Athenæum* of Dec. 21.)——HAZARD, SAMUEL. Santo Domingo, Past and Present; with a Glance at Hayti. London, 1872. (This book makes a timely appearance, considering the revival of the annexation project in this country, which the author favors.

He gives a useful map of the island, for which also Redpath's "Guide to Hayti" should be consulted. See review in the *Athenæum* of Dec. 28.)——JOHNSTONE, T. B., and ROBERTSON, Col. J. A. Historical Geography of the Clans of Scotland. With several maps, and plans of the battles of the Pretender. Philadelphia and New York: George Gebbie. 1872.——MEDHURST, W. H. The Foreigner in Far Cathay; with a map. London, 1872. (A valuable work on China.)——Overland, Inland, and Upland. London, 1872. (A Journey to India. See notice in *Athenæum* of Dec. 21.)

Periodical Literature.—*Ocean Highways* for December has an article on the Congo, by Lieut. Grandy, the leader of the "Livingstone Congo Expedition." He traces the history of discovery from 400 A.D., and says that no serious attempt has been made to explore the river since Capt. Tuckey's expedition of 1816. The last number for 1872 of the *Tour du Monde* has a review of the past six months by M. Vivien de St.-Martin, devoted entirely to the African explorations of Stanley and Schweinfurth, whose routes are traced on one full-page map, which is helpful in appreciating the Nile-Congo problem. The Lualaba is represented as cut off from the White Nile by the Welle, but no range of mountains interposes between it and the Albert Nyanza. No. 40 of the Berlin Geographical Society's Journal has a map of ancient Alexandria.

Cartography.—Col. Robertson Ross, Adjutant-General of the Dominion, has prepared a carefully corrected map of the immense territories lying west of Lake Superior, to accompany and illustrate his forthcoming report of his recent tour of inspection across the Continent.

——Following the example of Mr. Bennett of the *Herald*, the proprietors of the *Daily Telegraph* have placed an unlimited sum at the disposal of the Society of Biblical Archæology, to enable Mr. Smith, the author of the paper on the Chaldee account of the Deluge, to proceed to the East for the purpose of further investigation among the Assyrian ruins.

——Dr. Beke contemplates a journey to the East with a view to Biblical explorations. He proposes to look for "The Mount of God" in the country east of the Gulf of Akaba.

——The Berlin Geographical Society has opened subscriptions for the contemplated Congo Expedition. Dr. Güssfeld, the glacier explorer, who is to be the leader of the enterprise, has himself contributed nearly £1,000, and there is every prospect that the full amount necessary will be forthcoming.

——We learn from the *Times of India* that while Mr. T. T. Cooper is about to make another attempt to penetrate into China from Mo-

mein, the well-known French traveler, M. Garnier, who was the leader of the French expedition through Yunan into China, is about to start on another expedition from China through Thibet to India. M. Garnier has already left Hongkong for Shanghai to commence preparations for his journey.—*Nature*, Jan. 2.

Photography.—Our excursion this month will be wholly in America, but, thanks to the resources of the Messrs. Anthony, we shall skip at pleasure from the temperate zone to the tropics, and from sea to land.

(a) Here are eight of their magnificent Niagara views—broader as mounted than the Yo Semite views described last month, and with the sky filling half or even more of the picture. For, being instantaneous, they have been made to fix not only the spray and mist of the falls, but the fleeting cloud forms that float above them. For these combined effects nothing could well exceed two representing the American Falls, as seen from slightly different points, and one showing the Horse Shoe Falls and Terrapin Tower. More striking, perhaps, are the moonlight effects of cloud and sheen on the river above the falls. Of these we have selected three of singular beauty, among which it is hard to choose. A General View of the Falls, from the American side (Point View), unites almost all their salient and picturesque features, not excepting the groups of newly married folks who haunt the place with the return of every season. Lastly, a view of the New Suspension Bridge, taken from one of the cable towers, and looking straight down the middle of the track, gives a vivid idea of this stupendous and yet common-place achievement of engineering.

(b) The cluster of islands, known as the Bermudas, lies nearly due east of Savannah, about 900 miles distant. Mr. Balch has taken some "art views" of them which will be found interesting in many ways. No. 2 shows Front Street, in the capital city Hamilton (Bermuda or Long Island). The houses on the left testify in their construction to a sub-tropical climate, consisting of an open verandah below, and a latticed one above, reached by steps from the outside. Between the street and levee, at which several brigs and schooners are lying, is an ill-kept and rudely enclosed row of stunted trees. No. 3 overlooks the Admiral's Garden, and gives a fine prospect seaward or bayward. The foreground is very uneven and the soil seemingly poor, with no luxuriant growth of trees. No. 27, from the Lighthouse, is of wonderful extent, embracing so much of the archipelago that one readily concedes to it the traditional 365 islands. No. 79 is a most curious instantaneous view of the Devil's Hole—a natural aquarium in which numerous fish are seen in the act of swimming about in the clear water. No. 8 gives a banana and a papaw tree, the latter being the taller, with bare stem till the top is nearly reached; the banana has a pennate, palm-like foliage.

(c) For tropical vegetation, however, we may examine with more

satisfaction the fine series of views taken by the Selfridge Darien expedition in 1871. We find two noble specimens of the Cocoanut on the banks of the Tuyra River (flowing into the Bay of Panama), which we may compare with our old friends in the Bishop's Garden at Havana. A steam launch lies moored over opposite. The Bread-fruit tree has leaves which resemble those of the oak in a rough way. An Indian woman stands near by. The Mango tree near Pinogana recalls the Southern live-oak in its huge mass, of perfect symmetry, beneath which some one of the explorers is making himself comfortable in his hammock—perhaps the same shown in another view as taking his siesta under one of the thatched roofs of Chipigana, the village being seen below him. In a Forest Trail, and the Limon River at the Beach, we have glimpses of tropical tangle to us nameless. The India-rubber tree has the easy grace of our Northern birch. This specimen has been well hacked in its lower trunk, perhaps by the negro India-rubber Hunter shown in another view. He is on his way down the bank to his canoe, carrying in his right hand his hatchet, and supporting with the left on his shoulder his gun, a long and heavy knife, and a basket slung behind, whose contents are not discernible. From a satchel in front protrudes the handle of another tool. Our May Notes have told how they make rubber in Bolivia. Darien Harbor forms the subject of another view, and primitive peoples and manners are depicted in Chipigana from the Hills; a Group of Natives of the same place, standing in their canoe-yard, where building has evidently been going on; a Street Scene in Pinogana; and Santa Maria del Real, seen from the river, with the Cordilleras in the distance. The thatched houses have a very pleasing appearance, the least civilized being the Native Hut at Turbo (on the Gulf of Darien). Cartagena, founded in 1529, though Ojeda landed there twenty years before, is illustrated by numerous views. We can recommend the following as being characteristic, for streets, buildings, and inhabitants: the Main Gate; a Gate surmounted by a niche; the church called *de la Merci;* and a street or plaza in which the people are grouped about a donkey-cart.

THE *Scientific American* has recently given a statement relative to the extreme summer temperature of different parts of the world. Thibet is stated to be the hottest country in the summer, the temperature in the shade rising to 150°. In Senegal and in Guadaloupe the summer temperature is said often to reach 130°. Throughout the delta of the Ganges the mercury rises to 120°. Central America appears to have about the same summer temperature. In Cape Colony —the African diamond diggings—and in some parts of Utah, the mid-summer heat is 105°. These are the highest temperatures given, the European mean summer temperatures varying from 70° to 90°, Iceland according to its mid-summer heat at 45°, and Nova Zembla at 34°.

MORALS AND MANNERS.

A MAN of good morals is not necessarily a man of good manners, nor is a man of good manners necessarily a man of good morals. A person may have a polished address, and be exceedingly punctilious in all the conventionalities of society, and yet have a heart full of "evil thoughts, adulteries, murders, thefts, covetousness, deceit, lasciviousness, blasphemy, foolishness," all of which "defile a man," although he may never "eat bread with unwashen hands."

A case in point is that of a middle-aged minister of pleasing appearance and refined manners and of gifted tongue, who came some years since, with flattering recommendations, to a town in —— to aid in revival works. Making the acquaintance of a woman near his own age, refined and agreeable, of good family and possessed of a competence, but who had not made human nature a special study, he in a short time made her a proposal of marriage and was accepted. The ceremony was performed without delay, and on the next Sabbath the bride and groom made their appearance at church. At the conclusion of the sermon, he was invited by the minister in charge to make some remarks, which he proceeded to do, something on this wise:—"Riding once in the State of New York in early winter, I came to an apple-tree, upon which hung a single apple. I alighted from my horse, plucked the apple, and found it fair to look upon, without speck or blemish. Being eager to test its goodness, I hastily cut it open with my knife, and behold, it was rotten to the core. During the remainder of my ride I thought how much this apple resembled many professors of religion. Unblemished before the world, fasting and praying, giving tithes of all they possess, they yet have hearts full of all manner of iniquity." The next day our minister disappeared, taking with him a horse for which he had given his note endorsed by his wife's brother, and some money which he had borrowed of another member of her family. He has never been heard from since, except by way of two or three wives, whom he had married

under similar circumstances in other places. Shakspere describes such a person as

> "A goodly apple rotten at the heart."

On the contrary, one may hourly be a transgressor of the laws of good breeding, as laid down by polite society, and yet bring forth such fruits of the Spirit as "peace, long-suffering, gentleness, goodness, meekness and temperance."

The practice of good manners, as expounded by Lord Chesterfield, and as acted upon by people in general, has been said to be the art of deception. If this be so, it is a hypocrisy that in many cases is pardonable, for good breeding requires the suppression of many disagreeable acts, many words of reproof, and many harsh criticisms. Some persons lay up their good manners, as they do their good clothes, to be used only when absent from home; being crabbed, unreasonable, and morose in the family circle, but exceedingly amiable and courteous everywhere else. "Oh what a goodly outside falsehood hath" in people who thus act! "Manners," says Pope, "with fortunes turn." Shakspere has it,

> "Man, proud man,
> Drest in a little brief authority,
> Plays such fantastic tricks before high Heaven,
> As make the angels weep."

The old saw, "Put a beggar on horseback, and he will ride to the devil," more coarsely, but not less pointedly, expresses the same sentiment. Prosperity finds many a person arrogant and presuming, whom adversity saw well-mannered and unassuming.

Manners seem also to turn with times and seasons, with circumstances and localities. In the Southern States, the raising of the hat on meeting another person is considered a mark of servitude; with us, it is a mark of respect. Reproving a Southern pupil once for handing me a knife blade first, I was astonished to hear a well-bred lady remark, that she had never before been made aware that that was a violation of good breeding. Lord Chesterfield was very indignant at receiving a letter sealed with a wafer, and exclaimed, "What does the fellow mean by sending me

his spittle?" What would he say, if in this age he should see a whole nation violating this requirement of good breeding, in sending self-sealing envelopes moistened with the sender's saliva?

It would seem from all this, that it is exceedingly difficult to find any uniform standard of good manners. Society has one of its own, no doubt, but it may well be feared that hypocrisy lies at its base. In so far as this standard is founded upon the Scripture rule, "Do unto others as ye would that they should do to you," it is right; but beyond this it lies upon an unsound foundation, and will eventually fall with its own weight.

Society has established some nice distinctions in its code of morals. To one class of offenders it says, "Stand aside, we are holier than you;" while to another class, guilty of the same offense, it extends the hand of fellowship, and calls its crimes the follies of youth or the vagaries of middle age. It sends its police officers to arrest girls that may be aimlessly wandering about the streets of an evening, but allows boys to stand idly at the corners of the same streets, to frequent the billiard room, the gambling house and the dram shop, or to make night hideous with their revellings, on the plea that "boys must sow their wild oats."

The complaint has been recently made, that woman would prescribe the same social restraints, and the same moral regimen, for her son as for her daughter. If wrong be wrong, why should she not? Boys should not be taught that moral obligations rest more lightly upon them than upon their sisters, should not be taught that they may be brutes before they become men; and here comes in the work of the faithful teacher. Society, as now constituted, needs new light both in morals and in manners, and the coming generation must reflect that light. The great need of the age is not so much instruction upon these points, as the infusing of a spirit of moral courage into the hearts of the young. Of physical courage we have striking examples every day, but moral courage is a commodity rarely to be found in any market. The power to say No, or to acknowledge a fault, seems to have departed from the race with the fall of our first parents; for "The woman that

thou gavest me," was the plea of Adam, and "She is my sister," that of Abraham and Isaac, when their moral courage was put to the test. The punishment of the body for the crimes of the soul has been enlarged upon by the clergy, and practised by the laity, to such an extent that it requires almost as much courage to tell the truth when one is in fault, as it would be to walk into the blazing cannon's mouth.

In my school, the boy whose earnest asseverations I can least trust, is the one that is always ready, when others do wrong, to say, "They will go to the bad place and be burned up." Children should be taught to do right, not because it is the best policy, not because it will save them from punishment, but because it will make them lovable, will make them god-like. Honest men, all over our country, are beginning to be alarmed because rogues hold the balance of power; but it is so, only for the reason that many, very many, honest men are cowards, and their cowardice is known to the rogues who act upon it. Martyrs have fallen for our country upon that country's battle-fields, and martyrs will fall in the moral battle that sooner or later must be fought by our countrymen.

The children of our schools are in training for this great battle, and its issue depends entirely upon the amount of moral courage carried into it.

N. C. W.

RUSKIN, writing of himself, says: "I was obliged to write too young, when I knew only half-truths, and was eager to set them forth by what I thought fine words. People used to call me a good writer then; now they say I can't write at all; because, for instance, if I think anybody's house is on fire, I only say, 'Sir, your house is on fire;' whereas formerly I used to say, 'Sir, the abode in which you probably passed the delightful days of youth is in a state of inflammation,' and everybody used to like the effect of the two p's in 'probably passed,' and of the two d's in 'delightful days.'"

NURSERY RHYMES FOR LITTLE SCIENTISTS.

For the Little Botanist.

Little Bo-Peepals
Has lost her sepals,
And where do you think she'll find 'em?
In the involucre,
By hook or crook, or
She'll make up her mind not to mind 'em.

For the Chemical Child.

Sing a song of acids,
Base and alkali,
Four-and-twenty-gasses
Baked into a pie;
When the pie was opened,
Wonderful to say,
Oxygen and Nitrogen
Both flew away!

For the Astronomic Infant.

By-Baby bunting,
Father's gone star-hunting,
Mother's at the telescope
To read the baby's horoscope.
By-Baby Buntoid,
Father's found an asteroid;
Mother makes by calculation,
The angle of its inclination.

For the Young Geologist.

Trilobite, graptobite,
Nautilus pie,
Seas were calcareous,
Oceans were dry.
Eocene, miocene,
Pliocene, tuff,
Lias and trias,
And that is enough.

—*Open Hand.*

"*THE SPHEROIDAL STATE OF WATER.*"

IN our last number there was described and illustrated one of Nature's most wonderful laws, that of crystallization as it relates to the freezing of water and the formation of snow crystals. A second form, or rather condition, of water, is that known as the spheroidal state; and the facts relating to it are equally strange and wonderful. That the reader may the more clearly understand the nature of this phenomenon, reference is made to Fig. 1, as the experiment there illustrated may be readily repeated. The flat-iron, having been first heated, is held in the position shown; that is, inverted, with its point slightly lowered. Now, if upon this smooth, hot surface drops of water, or some other fluid, be permitted to fall from the end of a light rod, it will be noticed that instead of passing off in steam, as would be the natural result, these drops retain their spherical shape, and roll down and off the iron, just as though the metal were cold, and the drops those of quicksilver instead of water. The query at once suggested by the action of the water is a most natural one: Why is it that a fluid, which often, under a less heat, is converted into steam, now remains in its fluid state? Before replying to this question, let us, if possible, vary the experiment slightly. To do this, it is needful to suppose that the otherwise smooth surface of the iron has its centre slightly hollowed, so that if the iron were held square, and a drop allowed to fall upon it, it would no longer roll off, but would remain within the depression. We heat the iron, and add the drop, as suggested; but now mark the result. At first the little round crystal globule rushes now up one side, then across to the other, or rests trembling in the centre; but though

FIG. 1.

in a hot pan, as it were, yet it does not boil; and, if we could place in its centre the bulb of a miniature thermometer, the mercury would show that the water of the drop was not hot enough to boil,—that is, that it stood below 212° Fahr. But while we are making this trial, or watching the odd movements of the drop, the surface of the iron is becoming gradually cooler.

Now suddenly, and with no warning except a spiteful little hiss, all is changed: above there floats a little cloud of steam, and below is the smooth metal surface; not a sign of moisture, and the drop gone. All this in an instant; and yet, before that, there were perhaps minutes that it remained unchanged. Before replying to the main question, we will experiment a little further, in the manner shown in Fig. 2. Here we have a flat polished metal plate, heated by a

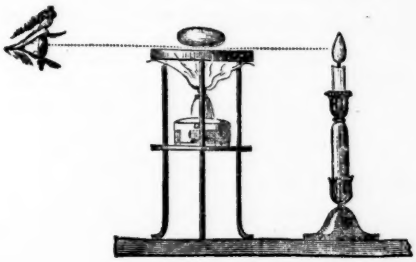

FIG. 2.

lamp beneath. When the plate is almost red hot, we drop carefully upon it the liquid from the rod. As in the first instance, the drop remains upon the surface; and, as the lamp keeps the plate hot, there is no danger of our restless little globule going off in steam. Let us now place on a line with the surface, as shown in the figure, a candle, and then, bringing the eye into the position shown, look across the surface on which the drop rests, or is *supposed* to rest,—for here is the whole secret, since, if the water actually touched the hot surface, it would boil and disappear. But the experiment with the candle shows that between the drop and the plate there is a thin space; and further investigation proves that this space is occupied by a thin layer or cushion of steam, which was formed the instant the drop

touched the hot surface, and upon this cushion it was held up, and thus, as it were, kept cool. The instant, however, that the metal cools to a given point, the charm is broken: the drop falls down into the hot surface, and is at once changed into steam. We have chosen to direct the attention of the reader to this wonderful law of fluids—first, because it *is* a wonderful law, and therefore should interest all who seek to know more of Nature and her works; and, second, because in this simple result we have illustrated one of the causes of steam-boiler explosions. From one who has made this question the subject of careful study and observation* we learn, that, in order for the spheroidal state to be assumed, it is necessary that the solid body be heated above a certain limit of temperature, which is special for each liquid, and which is lower in the degree that the liquid is more volatile. Thus, the limit for water is 288° Fahr.; for ether, 142° Fahr.; etc.; that is, the metal plate or flat-

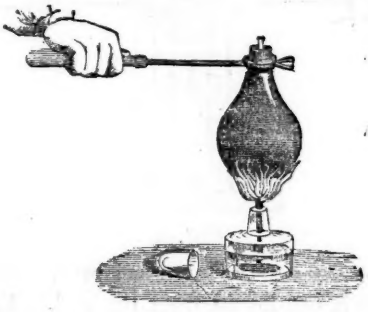

FIG. 3.

iron must be hotter than this before the drop will remain on it, and the moment that this point is reached the fluid volatilizes.

Consider now the boiler of a steam-engine. When in a normal condition, its sides, which are in contact with water, are alone heated by the fire. The water being thus kept at a constant temperature of the ebullition prevents the metallic sides of the boiler from becoming hotter. Now, if from any unexpected cause, such as the incrustation which sepa

* Achille Casin, author of "The Phenomena and Laws of Heat."

rates the water from the sides, they become heated to a much higher temperature, and by the flaking-off of the crust the hot surface is exposed, the water which comes in contact with it will at once assume the spheroidal shape. But the sides of the boiler are now gradually cooling, till the fatal point is reached, when the water, suddenly released from its peculiar condition, is converted into steam, and that so suddenly as to cause a pressure too strong to be withstood. In Fig. 3, this point is illustrated in a simple manner. A copper flask is heated, and then water introduced. As long as the high heat is kept up, the fluid remains in a flattened globule at the bottom of the vessel; but if the bottle be removed from above the flame, and thus be allowed to cool, the temperature will fall to 288° Fahr., and then all the water boils at once, and, as a result, the cork is driven violently from the top of the flask, or, if too closely fitted, the vessel itself is burst. While on this subject, it may be interesting to notice certain other experiments which serve to illustrate the same principle, and add another explanation to the often perplexing question, why a boiler should explode when the guages showed only a low pressure of steam, and plenty of water.

Mr. W. F. Barrett, in an interesting paper read before the British Association, describes the following experiment, made while investigating the conditions affecting the spheroidal state of liquids, and their possible relationship to steam-boiler explosions. Desiring to cool quickly a white-hot ball of copper, he plunged it quickly into a basin that stood near, containing soap and water. To his surprise, the ball entered the cold liquid without burning or the evolution of any steam or vapor, and, on being quickly removed, was found to be apparently as hot as before. Attracted by this peculiar and unexpected result, he repeated the experiment, only in this instance using a basin of fresh, pure water; when the usual hissing followed the immersion of hot metal, followed by a lively generation of steam, and a rapid cooling of the metal. From repeated experiments in which solutions of soap, glycerine, albumen, and other organic substances, were used, the writer discovered that in each of these liquids the heated copper ball entered smooth-

ly and quietly, glowing at a white heat even at a depth of a foot or more beneath the surface, the metal sphere being apparently surrounded by a vapor bubble, giving to it the color of burnished silver. As the ball gradually cools, this gaseous envelope slowly contracts, and finally collapses suddenly, followed by a loud report and the evolution of large volumes of steam. Reasoning from these results, the writer suggests an explanation of certain otherwise problematical boiler explosions. Traces of oil, or other organic matters, having found their way into the boiler, and under conditions similar to those explained above, may produce a sudden generation of steam of sufficient strength to burst it. —*Industrial Monthly.*

A CAT'S DREAM.—Animals, especially the dog, cat, and parrot, often indulge in the luxury of dreams. A correspondent of *Land and Water* tells the following anecdote of a cat: "She was very still, and appeared to be fast asleep, when suddenly she sprang into the middle of the room, where she fixed her feet on a limited spot on the floor, to which also her nose was applied, as if closely grasping something she held in her claws. This continued for a short time, when the nose was gently raised, and the visible attention was directed to the feet, which still continued their grasp; but after a time one of them was gradually removed, and then the other, at which puss appeared greatly at a loss to imagine whither the imaginary object could have gone, so as to escape her grasp. She looked in various directions along the floor, with a foolish face of confusion; and then again her attention was directed to the spot on which the feet were first closely pressed, as if to examine closely whether the presumed escape had been by sinking through the floor; and she returned more than once to re-examine the place, as if she found it impossible to comprehend how an object she had so plainly seen and grasped should have sunk into nothing. Many minutes elapsed before the cat appeared to be reconciled to the conviction that what had been a dream was not in truth a reality."

TRAVEL FOR TEACHERS.

IT is a good thing to read about historical places, but it is much better to visit them; it gives a sense of reality which one does not otherwise get. To travel in a country awakens interest in its past history not only, but it leads to a deeper concern in its present and future development. For we are all, perhaps unconsciously, disciples of the object-teaching system. To the child we describe the qualities of an apple, and then show it to him; the man reads French history and then goes to see France. Without this actual seeing of the object spoken of, there is some vagueness of ideas concerning it. On the cover of our school-atlas was a picture of the Leaning Tower at Pisa, but it seemed no more real to us than did the Palace of Aladdin. To be sure, "the book" said there was such a tower in existence, but did not that other much more charming book, the Arabian Nights, give as circumstantial an account of Aladdin's Palace? Of course, geographers cannot find it now, the history expressly recounts the manner of its disappearance, and to a child one thing in print is as true as another. So, the marvellous palace and scarcely less wonderful tower, were placed by us in the same category. But all this was changed one day by a gentleman who had been at Pisa, and told us about the tower. Then it became a real thing. We had not seen it, but we had seen some one who had, and we gazed with wonder on the man who had actually touched the walls which were pictured on our brown geography cover. A teacher who can say to a child—"I have seen this country," invests it with a reality and an interest not to be attained in any other way. To no class is travel more beneficial than to teachers; and, as a rule, they are prepared to profit by it. It needs an amount of preparation in history, geography, and literature, which other classes have not the time to acquire in this busy country of ours. For it is not only the things seen which instruct, the things suggested have an educating power. Standing on the Place de la Concorde, in Paris, the ordinary tourist sees

only a beautiful avenue and majestic buildings, and in the centre of the square an obelisk of stone. But the student recalls the scenes enacted in 1793, when Louis XVI was beheaded here, and when Marie Antoinette, whatever may have been her faults, died like a queen on this spot. The obelisk of Luxor, originally standing before the great temple of ancient Thebes, leads his thoughts to the kingdom which flourished ages ago. And so things of comparatively little interest to the ordinary traveler are full of suggestiveness to one prepared to travel. A foreign tour does much too towards removing prejudice. The best read people entertain erroneous ideas of foreigners. Contact with them shows us that human nature is much the same the world over. Different conditions of life result in different habits, and from these arise the peculiarities which do so much toward keeping nations asunder. Take for example our own country and England. Just after the conclusion of the Revolutionary war there was naturally much enmity between the two countries, but long after all ground of complaint had been removed the old hostile feeling existed, and it is only of late years that we have come to regard the English with any degree of complacency. Travel in England has corrected our ideas, and we have found the English very good people after all—strongly prejudiced, certainly, but no more so than we.

A person of accurate ideas, in regard to foreign lands and nations, is no where more valuable than in the school-room, for it is of great importance that the young should have a just appreciation of foreigners with whom they will have business relations.

We are led to make these remarks because of the extended attention which this subject is receiving just now in connection with the projected Educational Tour which we noticed last month. We hope that many teachers will avail themselves of this opportunity to spend the summer vacation in Europe.

EDUCATIONAL INTELLIGENCE.

STATE SCHOOL OFFICERS.

STATE.	TITLE.	NAME.	POST OFFICE.
Alabama	Supt. Public Instruction	Joseph H. Speed	Montgomery.
Arkansas	" " Schools	Thomas Smith	Little Rock.
California	" " Instruction	H. N. Bolander	San Francisco.
Connecticut	Sec. Board Education	B. G. Northrop	New Haven.
Delaware			
Florida	Supt. Public Instruction	J. C. Gibbs	Tallahassee.
Georgia	School Commissioner	J. R. Lewis	Atlanta.
Illinois	Supt. Public Instruction	Newton Bateman	Springfield.
Indiana	" " "	Milton B. Hopkins	Indianapolis.
Iowa	" " "	A. S. Kissell	Des Moines.
Kansas	" " "	H. D. McCarty	Leavenworth.
Kentucky	" " "	H. A. M. Henderson	Frankfort.
Louisiana	" " "	W. G. Brown	New Orleans.
Maine	Supt. Common Schools	Warren Johnson	Topsham.
Maryland	Prin. State Normal Sch.	M. A. Newell	Baltimore.
Massachusetts	Sec. Board Education	Joseph White	Boston.
Michigan	Supt. Public Instruction	Oramel Hosford	Lansing.
Minnesota	" " "	H. B. Wilson	St. Paul.
Mississippi	" " Education	Henry R. Pease	Jackson.
Missouri	" " Schools	John Monteith	Jefferson City.
Nebraska	" " Instruction	J. M. McKenzie	Lincoln.
Nevada	" " "	A. N. Fisher	Carson City.
New Hampshire	" " "	J. W. Simonds	Concord.
New Jersey	" " "	E. A. Apgar	Trenton.
New York	" " "	Abram B. Weaver	Albany.
North Carolina	" " "	Kemp P. Battle	Raleigh.
Ohio	Com'r Common Schools	Thos. W. Harvey	Columbus.
Oregon	Supt. Public Instruction	L. F. Grover	Salem.
Pennsylvania	" Common Schools	J. P. Wickersham	Harrisburg.
Rhode Island	Com'r Public Schools	T. W. Bicknell	Providence.
South Carolina	Supt. Public Instruction	J. K. Jillson	Camden.
Tennessee	" " "	Wm. Morrow	Nashville.
Texas	" " "	J. C. De Gress	Austin.
Vermont	Sec. Board Education	John H. French	Burlington.
Virginia	Supt. Public Instruction	Rev. W. H. Ruffner	Richmond.
West Virginia	" Free Schools	Chas. S. Lewis	Charleston.
Wisconsin	" Public Instruction	Samuel Fallows	Madison.

TERRITORIAL SCHOOL OFFICERS.

Colorado	Supt. Public Instruction	W. C. Lothrop	Denver.
Dakota	" " "	Jas. S. Foster	Yankton.
Idaho	" " "	Daniel Crane	Boise City.
Indian	" Inst'n. Cherokee Na.	Spencer S. Stephens	Tahlequah.
Utah	" Public Instruction	Robt. L. Campbell	Salt Lake City.
Wyoming	" " "	Dr. J. W. Hayford	Laramie.

THE Minister of Public Instruction for the Province of Quebec, in his report for the year 1870 and part of 1871, gives synopses of the reports of the different district inspectors. The account of progress is not very favorable. The general complaint is that the teachers' salaries are too small. We learn with surprise the insignificant amount some receive. In one district it ranges from $72 to $80 per annum. Inspector Crepault says: "It is not uncommon to see young ladies, clever in every sense, receive $60 per annum for their wearisome labor as teachers. The salary paid the bulk of our female teachers, for the most part trained in Normal schools, is under, rather than over, $200 per annum. As to male teachers, their respective yearly salaries do not exceed $300 per annum, and often do not reach $200." It is not strange, therefore, that the class of teachers is not so good as could be desired. We cannot expect improvement in this respect as long as we value intellectual ability below the price of manual labor.

"The project of establishing schools wherein shall be taught the application of science to art, in connection with the Catholic institutions of Montreal and Quebec, has been carried out in the latter city, by the opening of a special course of science, as applied to art and industry, under the direction and management of the Laval University. This course of lectures, inaugurated under such auspices, offers every guarantee both for its efficiency and success."

From 1857 to 1870, the schools have augmented in number 1,131, or 56 per cent., being an average increase of 87 each year.

THE Annual Report of the Board of Education of Rochester, N. Y., gives a favorable view of the public schools of that city. The whole number of pupils registered during the past year was 8,751, and the average daily attendance was 5,147.9. The amount of money expended was $114,000. The School Board appear to be worthy of their position. Not content with simply carrying on the necessary routine work, they sent Committees to various cities to study the workings of other schools, and get hints for the improve-

ment of their own. In compliance with the recommendation of one such Committee, German has been added to the list of studies in one school. If the experiment succeeds it will be introduced more generally.

THERE seems to be some misapprehension in regard to the four Protestant schools in Rome, recently closed by order of the police. The action was not prompted by hostility to the scheme, but because some formalities had been omitted, through ignorance on the part of Mr. Van Meter, the Superintendent. As soon as these difficulties are removed the schools will be reopened. They were quite well attended, one having over one hundred pupils. Food is furnished to the poorer children, and that of course attracts many. The closing of these schools was made the subject of debate in the Chamber, in the course of which, Signor Mussi stated —that in Rome upwards of 9,600 children were without instruction, and that a considerable number had gone to the American schools.

SUPT. PICKARD, of Chicago, reports that the schools of that city are "in better condition than they were before the fire." Although the fire destroyed fourteen buildings, containing room for about 10,000 pupils, in charge of 135 teachers, together with the office and all the records of the Board of Education, yet the school funds, fortunately, were safely deposited, and the schools were speedily in operation again. The amount of money donated for the relief of teachers and pupils, mostly from teachers and pupils in other places, was $22,678.18. The school population is 88,219; number of pupils enrolled, 38,035; average attendance, 22,996.4; number of teachers, 476 (only 31 males); number of school buildings, 45; of sittings, 28,581.

"A GOOD sign for Ireland" is the fact that the public Commissioners for Education reported, at the close of the year ending Dec. 1, 1871, that there were 6,914 schools, with 1,021,700 registered scholars, and an average daily attendance of 363,850. This was an advance over the previous year of 22,701 on the rolls, and of 4,651 in average daily attendance.

THE London School Board show that they placed at school during the last quarter 13,048 children by the use of the compulsory power. The Board have adopted the following rule with regard to religious instruction: "The Bible shall be read, and there shall be given such explanations and such instruction therefrom in the principles of religion and morality as are suited to the capacities of children."

IT is remarkable how rapidly the Japanese students acquire knowledge. The following instance will illustrate: In November, 1869, a young Japanese medical student entered the Berlin University, not even knowing the characters of the German language. He gave five months to the study of German, and in the remaining six months gained the knowledge of all the subjects, including Latin, which were required for the first examination. At the last examination in anatomy, he was one of the two candidates, who alone of the thirteen who presented themselves, obtained the notice "good."

THE Commissioners of Public Instruction of New York met Jan. 22d. The Annual Report of the City Superintendent was presented, showing the average attendance to have been 106,326, while the whole number taught was 235,880. The attendance in the First, Fourth, Sixth, Twelfth, Sixteenth, and Eighteenth Wards had decreased, but in all other Wards it had been larger than in 1871, especially in the Seventeenth Ward, where a new school had been opened. The absentees in 1872 were 13¼ per cent., against 18¼ in 1871. There is still room for 11,641 scholars in the public schools. Of the 2,552 classes, 587 were male and 536 female classes, 948 primary departments, 464 primary schools, and 17 colored classes.

On motion, it was resolved to memorialize the Legislature to enact a Pension Law for teachers of twenty-five years' standing.

The Finance Committee presented their financial statement for 1872, showing the receipts for the year as $3,454,818.73, and the expenditures, $3,270,237.95, leaving a balance of $184,580.78 in the hands of the City Chamberlain.

The President of the Normal College presented his report for 1872, showing the number of pupils on the register as 1,039, while the average attendance was 874. In the Model Primary School 310 scholars were registered, and the average attendance 261.

EFFORTS are being made to provide ampler facilities for instruction in India. There is great need of this, for, from a population of 190,000,000 only 622,342 children attend school. Private individuals have contributed large sums for the support of schools. Sir Jamsetjee Jejeeboy gave £200,000 stg., and Mr. Kustumjee Jamsetjee gave £10,000 stg. to educational instruction in Bombay and Guzerat. Female education is almost entirely neglected. In Calcutta there is some improvement in this respect. In 1861 there were only sixteen girls' schools, with a total of 395 pupils, but in 1870 the number of schools had increased to 284, and the number of pupils to 6,569.

THE correspondent of a Vienna paper, writing from Naples, says that there are to be important changes in the Chinese College of that place. It is to become an Asiatic College, where, besides history, geography, mathematics, French and English; Chinese, Arabic, Turkish, Persian and Hindostanee will be taught. The object of the institution will be to prepare young men for business pursuits and for diplomatic positions.

FROM the Annual Report of the Public Schools of Ontario, we learn that the total receipts for all school purposes, during 1871, amounted to $2,124,471. The total number of pupils enrolled were 446,326. This is exclusive of the 8,441 attending private institutions. Non-attendants, 38,535. In the 4,598 schools reported, 5,306 teachers have been employed—increase, 141; of whom 2,641 are male teachers—decrease, 112; and 2,665 are female teachers—increase, 253. It will thus be seen that the number of female teachers is yearly increasing and that of males decreasing. The largest salary paid is $1,000, and the smallest $100. The report points out the folly of employing "cheap teachers."

The Report of the Boston Public Schools gives the following statistics: Whole number of pupils belonging to day

schools, 36,234; evening schools, 2,072; evening drawing schools 400; number of teachers, 1,001. Total expenditure for a. school purposes, $1,314,380.33. The progress in drawing has been very satisfactory. Under the superintendence of Mr. Walter Smith, many teachers are fitting themselves to give instruction in this important branch of study.

CURRENT PUBLICATIONS.

IT has been some little time since an American Grammar of any pretensions has been given to the public. But now, a new candidate for favor and adoption (1) has made its appearance. Prof. Swinton's book, however, is something more than a grammar. It is a condensed treatise on Analysis and Composition as well. The general mode of treating these subjects is good. It aims to be both progressive and practical. Hence the simpler and less abstruse facts are presented first; and, as successive facts are gradually unfolded, brief practical lessons are added, so that the learner may apply the principles he has been over, and be better enabled to remember them, and be profited by them. One decided advance on most Grammars in common use is the entire rejection of orthography and prosody from its pages. These subjects were similarly treated by Ben Jonson more than two hundred years ago, and they ought never to have been introduced into Grammars afterwards. They constitute no part of Grammar, properly so called.

But when we come to the details of this work, we find a number of things of which we can not speak so favorably.

We never could see what addition "the historical element" really was to a work the aim of which is, not to teach historical facts, even though they be of a linguistic nature, but "to furnish school-boys and school-girls with an available outfit of knowledge" for using English properly in

(1) A PROGRESSIVE GRAMMAR OF THE ENGLISH TONGUE; BASED ON THE RESULTS OF MODERN PHILOLOGY. By Prof. William Swinton, A.M., Author of "Word-Analysis," etc. New York: Harper & Brothers. 16mo., pp. 207.

speaking and writing. Under this view, of what advantage are observations like the following: "Incomplete verbs that require," etc., "are called Transitive *(trans*, over, and *ire*, to go)." How much wiser will school-boys and school-girls generally be for the closing parenthetical words? Again, on page 46 may be found the following questionable and useless statement: "The suffix *-ed*, which is the inflection of the past tense, is a contraction of the word *did*." A scholar might ask, as we once heard a young man ask, "Where did the suffix *-ed* or *-id* in the word *do-ed* or *d-id* come from?" The volume has altogether too much matter of this kind. We should reject the historical element, whether philological or etymological, altogether.

When we come to particulars, we do not see that the "Etymology" of this book is superior to that of several other grammars already before the public. In some respects, indeed, it is inferior. Many of its definitions are far from clear or correct. Opening at page 36, we read, "The *noun* used as object of a verb or of a preposition is usually *called the objective case*." If we are not mistaken, it is "usually," and more correctly, said to be "*in* the objective case." But this comes from the author's misconception of what the case of a noun is. On the same page we are told "A noun is said to be 'declined' when we name its three cases." Suppose a boy is asked to "decline" the noun *man*. He proceeds, "names its three cases" thus: "Nominative case, Possessive case, Objective case." Can he be blamed if he blunders thus? He has but followed the book. Talk about grammar being dull and stupid! How can it be otherwise when taught from books and by teachers that do not express themselves clearly, or rather have no clear idea of the thing they are trying to teach?—These are merely samples of the author's "definitions." But we pass on.

The classification of both nouns and verbs is objectionable and deficient. The condensed form in which the paradigms of verbs are given is fanciful and puzzling to children if not to older heads. Its object is brevity; but it is brevity at the expense of clearness. The treatment of the subjunctive mood is a failure. The only subjunctive that the author

finds is an elliptical potential or indicative. See pages 48–49. The true English subjunctive he ignores altogether. And yet he says very nonchalantly, p. 48, "The matter is really very simple." So thought Alexander when he cut the Gordian knot instead of untying it. But this solution of the little "puzzle" was not probably the most satisfactory.

The syntactical treatment of many points is more than questionable; it is plainly erroneous. On p. 9 we find this: "In such a sentence as 'three and two is five,' the *and* has not the function of a conjunction; it is here used as a preposition, and is equivalent to *with*." The same nonsense, together with more like it, is repeated on page 80. The author could not say, "The sentence is erroneous; *is* should be *are*." This would have spoiled his short but imperfect definition of a conjunction. Think of a grammarian justifying "Two and two *is* four!" We hope it will be a long day before the writers or teachers of primary arithmetic will write or teach the addition table after this manner. Mr. Swinton's exposition, p. 89, of the phrase "A house of my uncle's," is the old but wrong one. His rule, p. 90, in regard to "verbals in -ing" is contradicted by himself, and very properly, on p. vii of preface, in the sentence "He found it needful to separate the abstract maxims used in disposing *of* words," etc. The treatment, p. 103, of *his*, in the lines—

> "And do you now strew flowers in *his* way
> *That* comes in triumph over Pompey's blood?"

as "an adjective," and consequently unsuitable to be used as an antecedent for a relative pronoun, though not original, is unfounded and puerile. The objection would hold good against any noun in the possessive. The true criticism to be made here is "Use *who* rather than *that* in such instances." We have marked a number of other passages of a similar character, embodying crude or false instruction; but want of space forbids our noticing them.

The book, as a whole, is quite carefully written. Occasionally, as may be expected even in a grammarian, an error in composition occurs. A number of needless typographical errors also occur, one of them making Mr. Moon appa-

rently the author of a wretched blunder. These, of course, will be corrected in a second edition. There is a lack, we think, of exercises to illustrate and enforce the principles and rules given. Of review exercises there are none. An addition to this department would enhance the value of the book. The superfluous notes might very well yield to more of practical matter.

On the whole, we can hardly consider this a model English Grammar. We think we would much rather have one or more of the old ones. Perhaps a "model" Grammar never will be written. Still, we hope it may; and every additional effort to do it leads us to believe it will; if not in our day, in the "good time coming."

DR. JOHNSON'S CHARTS, containing diagrams of philosophical apparatus, and diagrams illustrating the principles of Natural Philosophy and Astronomy, have long been favorably known to all educators. They received the emphatic endorsement of such veteran and experienced teachers as Horace Mann, Dr. Wayland and President Frelinghuysen. They cheered the heart of many a teacher of Physics in his laudable efforts to make plain without the necessary apparatus the principles of science. In many a school and academy, too poor to procure an outfit of globes, and planetarium, and air pumps, and steam engines and electrical machines, these charts came as a perfect repository of figures and illustrations for the philosophical class-room. To the ingenious young mechanic striving to get a clear notion of Watt's great invention, Dr. Johnson came with his admirable diagram of the steam engine, with all its intricate combinations of pistons and cranks and valves and condensers, and in a trice the thing was clear as day. How many of the valuable and ingenious inventions and improvements which have made American skill conspicuous throughout the world, may be traced to the impulse given to youthful ingenuity by these charts! How much they are now doing to improve in all the schools the methods of teaching, and to clear up the thoughts both of teachers and scholars, in a class of subjects which more than all others require "object teaching!"

There was one feature about these charts which always

seemed especially to be commended. The diagrams were all drawn with bold, firm lines, which made it easy to imitate them on the blackboard with chalk. And no way compared in effectiveness for clearing up a lad's notions of a piece of apparatus with that of setting him with chalk and ruler and string to reproduce the same diagram on the black-board on a larger scale.

Dr. Johnson's book (2) has grown out of these charts. It is a handsome volume of nearly 500 pages, in beautiful clear type, illustrated with an average of more than a diagram for each page. The diagrams are reduced by photography from the charts, and possess the same admirable features of clearness, boldness and simplicity. They are printed in white lines on a black ground, which adapts them particularly to reproduction on the black-board. We may say that we know of no wood-cuts of this description which are so well printed. It has usually been thought that wood-cuts on a black ground could not be well printed, and therefore could not be made available in many cases where otherwise they would be particularly appropriate. This book at least cannot be thus criticised.

The letter-press of the book consists mainly in brief, explicit explanations of the diagrams. It therefore forms primarily a hand-book for the charts. But in addition to this it will be found that the explanations are so complete, and so systematically arranged, that they form in fact a treatise on Natural Philosophy. As such it might very well be used, and put into the hands of those beginning the study of Physics and Astronomy. From its very nature, the book is not a complete treatise on these subjects, because the use of mathematical formulæ and of elaborate discussions is avoided. It is in reality an attempt to convey to untrained minds, by the free use of diagrams, and by the use of common and untechnical phraseology, a clear although not a complete knowledge of these important sciences. As such it must be pronounced a most successful effort. And its use in connection with the charts is most earnestly to be commended.

(2) JOHNSON'S NATURAL PHILOSOPHY AND KEY TO PHILOSOPHICAL CHARTS, illustrated with 500 cuts; for the use of schools and families. By Frank G. Johnson, A.M., M.D. Pp. 494, 8vo.

THE tendencies toward the popularization of Science are every day more and more apparent; and in this place we may as well define what we mean by *popularizing science;* it is not the issue of books or essays on scientific subjects by those who are mere smatterers in science, and who if they attempt to present a popular view of any topic of scientific study, will be sure to fall into some egregious blunder, and lead their readers astray; of this mode of popularizing science we have had more than enough in many of the school text-books which have been and still are in vogue in certain quarters; but the true popularization of science is the work of a master; one who himself thoroughly imbued with knowledge on the subject of which he speaks, has yet that sympathy with the people that he can put himself in their place, and make his knowledge fully available for their instruction. To this class belong Professor Tyndall, whose works and whose charming lectures have done much to popularize recent discoveries in the laws of light, in electricity, in spectroscopy, and in the domain of heat; Agassiz, whose lectures on fossils and geological topics are so delightfully instructive, Prof. Youmans, whose services in this direction are of great value; Prof. Barker, of New Haven, who has been over a part of the same topics as Tyndal, and Profs. E. S. Morse and B. G. Wilder, whose researches in the department of Animal and Human Life have been so interesting and valuable. To this class, though in a slightly different department of science, also belongs the eminent French physicist Elisée Reclus, whose two volumes,(3) "THE EARTH" and "THE OCEAN, ATMOSPHERE AND LIFE," are by much the most complete popular treatises on physical geography yet published. It has been well remarked of these volumes, that if we did not know these descriptions of the life of the globe to be true, they would rank as the most charming of romances; but that knowing their author to be one of the most eminent and truthful of physical geographers, we are compelled to give them the

(3) "THE EARTH: A DESCRIPTIVE HISTORY OF THE PHENOMENA OF LIFE ON THE GLOBE." By Elisée Reclus; and "THE OCEAN, ATMOSPHERE AND LIFE;" being the Second Series of a Descriptive History of the Life of the Globe. By Elisée Reclus. Two vols. 8vo, with nearly 550 maps and plates. New York: Harper & Brothers.

first rank in that trio celebrated by Victor Cousin, as "The True, the Beautiful and the Good." Much of the matter of the second volume ("The Ocean, etc.,") is the result of the personal observations of M. Reclus, and all of it is fully verified by the testimony of competent and able observers. The Ocean, the Atmosphere, and its meteorology and perturbations, the Flora and Fauna of the world, the influence of climate and topography, of sea, river and lake, of mountain, valley and plain, and the course of history on the various races; and the influence which man himself has exerted on the earth by his works, all are discussed with great interest and power. The elegant colored maps and the profusion of fine illustrations which the publishers have provided, aid in making them most valuable additions to every school or popular library as well as to the working library of every successful teacher. They will aid greatly in enabling him to make physical geography an interesting and profitable study. The same publishers have made a valuable contribution to our knowledge of our great domain on the Pacific Slope, in the publication of Mr. Charles Nordhoff's "CALIFORNIA."(4) Mr. Nordhoff describes geographically, and backs up his glowing pictures by a formidable array of statistics. We sometimes half suspect that he occasionally looks through rose-tinted spectacles, as when he extols so highly Santa Barbara, San Bernardino and San Diego as offering an almost absolute cure for that terrible scourge, consumption; for we have too vividly in mind the sad fate of dear friends who went there, invalids, indeed, but not apparently far advanced in the disease, but after some months' residence, fell victims to the disease, and as it seemed to us, as soon as they would have done here. But the volume, as a whole, is replete with interest, and gives to the geographer, as well as to the traveler and prospective settler, a large amount of information in regard to the climate, topography, agriculture, productiveness, and mining and commercial interests of Southern California, not elsewhere to be found. The advent of Froude, Burke and others as lecturers on Irish and English History, and the

(4) "CALIFORNIA: FOR HEALTH, PLEASURE AND RESIDENCE. A BOOK FOR TRAVELERS AND SETTLERS." By Charles Nordhoff. New York: Harper & Brothers.

bitter and persistent Meline-Froude controversy in regard to Mary, Queen of Scots, have imparted a new interest to the study of English history, especially of the period of the Tudors; and it is fortunate for American readers that there should have appeared, just at this time, two narratives of Tudor Times,(5) which, in the careful accuracy of their record of the events of those times, their fidelity to the manners, customs, and language of the period, and their skillful limning of the prominent actors, both princes and nobles, throw more light upon the era of the Tudor dynasty than any merely historical work could possibly do. Miss Holt has drawn her historical sketches, as well as her portraitures of family and court life from original sources in the state paper office, the British Museum, and the office of the Master of the Rolls, and her investigations have been as thorough and extensive as those of Froude, Macaulay, or Miss Strickland. The books have a religious purpose, but this has never been allowed to warp the facts or becloud the writer's judgment. No other attempt to depict the life of the English people in a period so remote, has been anything like so successful as these; and if the same writer will go on with the reign of Elizabeth in the same painstaking yet graphic style, she will confer a greater boon on the readers of English literature and history than has yet been bestowed by any writer, male or female, of our times.

MISCELLANEA.

HOW rare a thing it is to find *memoriter* quotations, professedly verbatim, given with entire exactness, few are aware, unless they have taken the pains to verify them. In Royse's *American Literature*, p. 357, we find this, in an extract from an address of E. P. Whipple's—a man, certainly, whom one could not expect to catch tripping:

> Like snowfalls *on a* river,
> *One* moment white, then *gone* forever.

(5) "ISOULT BARRY, OF WYNSCOTE: A TALE OF TUDOR TIMES." By Emily Sarah Holt; and "ROBIN TREMAYNE: A TALE OF THE MARION PERSECUTION." By Emily Sarah Holt. New York: Robert Carter & Brothers.

Burns wrote (see *Tam O'Shanter*):

> Like the snowfall in the river,
> A moment white—then melts forever.

In Hart's *Am. Lit.*, p. 103, is a prose citation from Whittier, ending with this from *Paradise Lost*, III. 37:

> Feed on thoughts *which voluntarily make*
> Harmonious numbers.

This is revision with a vengeance! Milton wrote:

> Feed on thoughts that voluntary move.

The Quaker poet could not have made so harsh and unrhythmical an alteration. It must be Hart's blunder. In this opinion we are confirmed by the fact that, on p. 163 of his *Rhetoric*, he presents the following line as good heroic verse:

> Talent the sunshine on a cultivated soil.

However, in this case, as in some others, he can fall back upon Bain as his authority.

A RECENT calculation relative to the principal European languages shows that English is spoken by ninety millions of persons, inhabiting Great Britain and Ireland, North America, the Bermudas, Jamaica, Cape of Good Hope, Australia, Van Diemen's Land, Newfoundland, and the East Indies; German by fifty-five millions, in their own country, Switzerland, Austria, Hungary, Russia, North and South America, La Plata, Australia and the East Indies; Spanish by fifty-five millions in Spain, Cuba, Mexico, the republics of South America, Manilla, etc.; and French by forty-five millions in France, Belgium, Switzerland, Canada, Cayenne and North America.

IF a tallow candle be placed in a gun, and shot at the door, it will go through without sustaining any injury; and if a musket-ball be fired into water, it will not only rebound, but be flattened as if fired against a solid substance. A musket-ball may be fired through a pane of glass, making the hole the size of the ball, without cracking the glass; if the glass be suspended by a thread, it will make no difference, and the thread will not even vibrate.